

B. AMENDMENTS TO THE CLAIMS

Claims 1-76 (cancelled)

77. (currently amended) A component transfer system for transferring at least one electrical component to be placed on a substrate, wherein the component has a superficial fiducial marker on a surface of the component and wherein the fiducial marker indicates an orientation of a plurality of leads protruding from the component, said component transfer system comprising:

a component feed source supporting the at least one component;

a component transfer mechanism oriented to retrieve the at least one component from the component feed source and place a retrieved component in a transferred area such that the fiducial marker on said component is visible for detection prior to retrieval from said component feed source and placement of said retrieved component on the substrate;

an optical fiducial marker detector oriented to detect the fiducial marker on said component prior to retrieval from said component feed source and placement of said retrieved component on the substrate, ~~and generate~~ said optical fiducial marker detector generating alignment data for said retrieved component in response to detection of the fiducial marker on said component, said alignment data representing lead orientations for said component; and

a controller coupled to said fiducial marker detector for receiving said alignment data therefrom for said retrieved component and containing instructions which, when executed, cause said controller to compare said alignment data for said retrieved component to desired alignment data indicative of desired lead orientations, said controller sending

realignment signals to said component transfer mechanism for said retrieved component wherein the alignment data therefore differs from said desired alignment data to cause said component transfer mechanism to realign said retrieved component when the alignment data therefore differs from the desired alignment data.

78. (previously presented) The component transfer system of claim 77 wherein the component transfer mechanism comprises a pick and place machine.

79. (previously presented) The component transfer system of claim 78 wherein said pick and place machine comprises:

- a pick spindle having a plurality of placement heads; and
- a placement spindle having a plurality of placement heads.

80. (previously presented) The component transfer system of claim 77 wherein said component feed source comprises a continuous track of trays operably supported by continuous tape reels.

81. (previously presented) The component transfer system of claim 77 wherein said component feed source comprises a source of components and at least one serial feed track extending from said component feed source to said component transfer mechanism.

82. (currently amended) A component transfer system for transferring at least one electrical component to be placed on a substrate, wherein the component has a superficial fiducial marker on a surface of the component and wherein the fiducial marker

indicates an orientation of a plurality of leads protruding from the component, said component transfer system comprising:

a component feed source supporting the at least one component;

a component transfer mechanism oriented to retrieve the at least one component from the component feed source and place a retrieved component in a transferred area such that the fiducial marker on said component is visible for detection prior to retrieval from said component feed source and placement of said retrieved component on a substrate;

an optical fiducial marker detector oriented to detect the detectable location of the fiducial marker on said component prior to retrieval from said component feed source and placement of said retrieved component on a substrate, ~~and generate~~ said optical fiducial marker detector generating alignment data for said retrieved component in response to detection of the fiducial marker on said component, said alignment data representing lead orientations for said component; and

a controller coupled to said fiducial marker detector for receiving said alignment data therefrom for said retrieved component and containing instructions which, when executed, cause said controller to compare said alignment data for said retrieved component to desired alignment data indicative of desired lead orientations, said controller sending realignment signals to said component transfer mechanism for said retrieved component wherein the alignment data therefore differs from said desired alignment data to cause said component transfer mechanism to move said retrieved component to a discard area when the alignment data therefore differs from the desired alignment data.

83. (previously presented) The component transfer system of claim 82 wherein the component transfer mechanism comprises a pick and place machine.

84. (previously presented) The component transfer system of claim 83 wherein said pick and place machine comprises:

- a pick spindle having a plurality of placement heads; and
- a placement spindle having a plurality of placement heads.

85. (currently amended) A component transfer system comprising:

a plurality of electrical components for placement on one or more substrates, each component having two sides that are substantially parallel to each other and that each have an equivalent number of leads protruding therefrom, and wherein each component has a first marker on a surface of the component and wherein the first marker superficially alters a physical appearance of the component to indicate a predetermined orientation of the leads, said plurality of components supported in a component feed source;

a pick and place machine oriented to retrieve a component from the feed source and place a retrieved component in a transfer area such that the fiducial marker is visible for detection prior to retrieval from said component feed source and placement of said retrieved component on a substrate;

an optical marker detector oriented to detect the marker on the component prior to retrieval from said component feed source and placement of said retrieved component on a substrate, ~~and generate~~ said optical fiducial marker detector generating alignment data for said retrieved component in response to detection of the fiducial marker on said component, said alignment data that is indicative of the position of the marker within the transfer area, said alignment data and representing lead orientations for said component; and

a controller in communication with said marker detector for receiving said alignment data therefrom and containing instructions which, when executed by the controller, cause the

controller to compare the alignment data received from the marker detector and compare it to predetermined alignment data to ascertain whether the retrieved component is correctly aligned within the transfer area.

86. (previously presented) The system of claim 85, further comprising a continuous serial track extending from said component feed source to said pick and place machine.

87. (previously presented) The system of claim 86, further comprising a plurality of component trays serially disposed along the continuous serial track

88. (previously presented) The system of claim 85, wherein each component has a second marker on the surface of the component, wherein the second marker indicates the predetermined location of the leads.

89. (previously presented) The system of claim 85, wherein the marker detector is directed toward the feed source and has a signal output associated with the predetermined orientation of the leads.

90. (previously presented) The system of claim 85, wherein the pick and place machine comprises:

a pick spindle having a plurality of pick heads; and

a placement spindle having a plurality of placement heads.

91. (new) A system for transferring electrical components, comprising:

- a plurality of electrical components, each component having a fiducial marker that structurally alters the physical appearance of the component;
- a component feed assembly for feeding the plurality of components;
- a nest having a nest surface and containing a recess shaped to mate with the fiducial marker on anyone of the plurality of components fed thereto by said component feed assembly only when the component is oriented in a desired orientation;
- a component alignment detector including:
 - a receiver located at a side of said recess; and
 - an emitter located at a side of said recess opposite said receiver and directing a pattern of radiation toward said receiver above said nest surface, and wherein any of said fed components that is misaligned in said nest disrupts said radiation pattern; and
- a pick and place machine having a movable pick head, said movable pick head having access to said component feed assembly and said asymmetric recess of said nest.

92. (new) The system of claim 91, wherein said receiver compares said radiation pattern to a known radiation pattern.

93. (new) A system for transferring electrical components, comprising:

- a plurality of electrical components, each component having a fiducial marker that structurally alters the physical appearance of the component;
- a component feed assembly for feeding the plurality of components;
- a nest having a nest surface and containing a recess shaped to mate with the fiducial marker on anyone of the plurality of components fed thereto by said component feed

assembly only when the component is oriented in a desired orientation;

a component alignment detector directing a pattern of radiation above and parallel to said nest surface and wherein any of said fed components that is misaligned in said nest disrupts said radiation pattern; and

a pick and place machine having a movable pick head, said movable pick head having access to said component feed assembly and said asymmetric recess of said nest.

94. (new) A system for transferring electrical components, comprising:

a plurality of electrical components, each component having a fiducial marker that structurally alters the physical appearance of the component;

conveying means for conveying the plurality of components;

a nest having a nest surface and containing a recess shaped to mate with the fiducial marker on anyone of the plurality of components fed thereto by said component feed assembly only when the component is oriented in a desired orientation;

means for moving at least one of said plurality of components from the conveying means to the recess; and

means for detecting the alignment of said at least one of said plurality of components in the recess.

95. (new) The system of claim 94 further comprising means for comparing the detected alignment of the component in the recess with a predetermined alignment of the component in the recess.

96. (new) The system of claim 94 further comprising signal means indicative of whether the detected alignment of the component in the recess corresponds to a predetermined alignment of the component in the recess.

97. (new) The system of claim 91, wherein said feed assembly includes a feed source.

98. (new) The system of claim 97, wherein said component assembly includes a continuous reel tape.

99. (new) The system of claim 97, wherein said component assembly includes a plurality of serial feed tracks.

100. (new) The system of claim 91, wherein said recess includes a beveled edge.

101. (new) The system of claim 91, wherein the component does not extend beyond said nest surface when the component is properly aligned in said nest.

102. (new) The system of claim 93, wherein the detector includes a plurality of receivers corresponding to a plurality of pick heads.